

AN ANALYSIS OF COMPOSTING BASED MICROBIAL: GROWTH PARAMETER



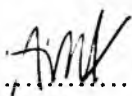
**FAKULTI KEJURUTERAAN KIMIA
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA**

AINUL AZWANNI BINTI AHMAD

NOVEMBER 2009

DECLARATION

“I hereby declare that this report is the result of my own except for quotations and summaries which have been dully acknowledged.”


.....
AINUL AZWANNI BINTI AHMAD
2006844369

Date: 25.11.2009

ABSTRACT

In the modern world and sophisticated current technology, composting had been a good ways to decompose solid waste. These solid wastes include food wastes, kitchen wastes and garden wastes. Composed materials can be used as a fertilizer to enhance the growth of plant such as vegetable, flower and event fruits. The purpose of this study is to culture the bacteria and determine which factors that contributes to the growth of microbial composting. In this study, three factors were selected which are temperature, concentration of brown sugar and different nutrients for bacteria. The bacteria that had been used were effective microorganisms (EM) and food waste bacteria. EM's generally are combination of five classes of bacteria meanwhile food waste bacteria is just a newly developed bacteria. Two temperatures were considered in the studies which were 35°C and 45°C and the concentration sugar were 10g, 5g and 1g. The parameters that need to be observed were glucose concentration, pH and cell concentration in order to see the growth profile of each bacterium. Different result had been achieved in different condition, where each bacterium gives a different growth profile. Since brown sugar is one of the sources of sucrose, this had affected the result of glucose consumption as the bacteria tend to break the sucrose formation into glucose and fructose. Most of the bacteria can live in pH neutral at the beginning and become acidic after 24 hours. While the cell concentration increase with time showing rapid increase of the growth of each bacterium.

TABLE OF CONTENT

	PAGES
AUTHOR DECLARATION	ii
CERTIFICATION	iii
LIST OF TABLE	v
LIST OF FIGURES	vi
LIST OF NOMENCLATURE	xi
TABLE OF CONTENTS	xii
ACKNOWLEDGEMENT	xvii
ABSTRACT	xviii
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1
1.2 Problem Statement	2
1.3 Objective	3
1.4	
CHAPTER 2 LITERATURE REVIEW	
2.1 Composting	4
2.2 Factors Affecting the Composting Process	5
2.2.1 Carbon to Nitrogen Ratio of the Material	5
2.2.2 Amount of Surfaced Area Exposed	6
2.2.3 Aeration	7
2.2.4 Moisture	7
2.2.5 Temperature	8
2.2.6 pH Level	9
2.3 Composting Phase	10
2.3.1 Lag Phase	11
2.3.2 Active Phase	11
2.3.3 Maturation or Curing Phase	11
2.4 Microbiology of Composting	12
2.4.1 Bacteria	12

	PAGES
2.4.2 Actinomycetes	14
2.4.3 Fungi	16
2.5 Microbial growth	18
2.5.1 Chemical and Energy Requirement	18
2.5.1.1 Oxygen Requirement	18
2.5.1.2 Nutrient Requirement	18
2.5.2 Physical Requirement	19
2.5.2.1 Temperature	19
2.5.2.2 pH	21
2.5.2.3 Moisture Content	22
2.6 Phase of Microbial Growth	23
2.7 Effective Microorganism (EM)	
2.7.1 Introduction of EM	25
2.7.2 EM in Agriculture	27
2.7.3 EM in Environmental Management	29
2.7.4 EM in Animal Husbandry	30
2.7.5 EM in Forestry	30
2.7.6 EM in Integrated Farming (Systemic-Comprehensive Farming)	31
2.7.7 EM Working Principal	32
2.7.8 The Quality of Activated EM	33
2.8 Soil pH	
2.8 .1 The Significance Of pH	35
2.8.1.1 Availability of Nutrients	35
2.8.1.2 Microorganism	36
2.8.1.3 Pesticide Interaction	36
2.8.1.4 Mobility of heavy metals	36
2.8.1.5 Corrosivity	36
2.8.2 Microorganism in Soil	37